

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) A process for making a catalyst comprising:
altering the precipitation of a catalyst component from a catalyst synthesis solution by controlling the viscosity of a catalyst synthesis solution with the addition of aluminum alkyls hydrocarbyl or substituted hydrocarbyl moieties, wherein the average particle size of the catalyst component increases with an increased concentration of aluminum alkyl in the synthesis solution.
2. (original) The process of claim 1 further comprising contacting the catalyst component with an organometallic preactivating agent to form a catalyst, wherein the average particle size of the catalyst increases with an increased concentration of aluminum alkyl in the synthesis solution.
3. (currently amended) The process of claim 1 ~~wherein the catalyst synthesis solution comprises~~ additionally comprising:
contacting a magnesium dialkoxide compound with a halogenating agent to form a reaction product A; and
contacting reaction product A with a series of halogenating/titanating agents to form a catalyst component; and
contacting the catalyst component with an organometallic preactivating agent to form a catalyst; wherein the average particle size of the catalyst increases with an increased concentration of aluminum alkyl in the synthesis solution.
4. (original) The process of claim 3 wherein at least one of reaction product A and the resulting reaction products after each halogenating/titanating step are washed with a solvent to remove contaminants.
5. (currently amended) A process for making a catalyst comprising:

a) contacting a magnesium dialkoxide compound with a halogenating agent to form a reaction product A;

b) contacting reaction product A with a first halogenating/titanating agent to form reaction product B;

c) contacting reaction product B with a second halogenating/titanating agent to form reaction product C; and

d) contacting reaction product C with a third halogenating/titanating agent to form reaction product D; and

e) contacting reaction product D with an organometallic preactivating agent to form a catalyst; wherein the magnesium dialkoxide compound is a the reaction product of ~~a reaction comprising~~ a magnesium alkyl compound of the general formula $MgRR'$, wherein R and R' are alkyl groups of 1-10 carbon atoms and ~~may be~~ are the same or different, an alcohol of the general formula $R''OH$ wherein the alcohol is linear or branched and wherein R'' is an alkyl group of 2-20 carbon atoms, and an aluminum ~~alkyl~~ hydrocarbyl or substituted hydrocarbyl moieties of the formula AlR'''_3 wherein at least one R''' is an alkyl or alkoxide having 1-8 carbon atoms ~~or a halide~~, and wherein each R''' ~~may be~~ is the same or different; and wherein the average particle size of the catalyst increases with an increased aluminum alkyl to magnesium alkyl ratio.

6. (original) The process of claim 5 wherein the ratio of aluminum alkyl to magnesium alkyl is in the range of about 0.01:1 to about 10:1.

7. (currently amended) The process of claim 5 wherein the halogenating/titanating agents of steps c) and d) each comprise titanium tetrachloride as the halogenating/titanating agents and the titanium tetrachloride to magnesium alkyl ratio is in the range of about 0.1 to about 5.

8. (currently amended) The process of claim 6 wherein the magnesium dialkoxide compound is a magnesium di(2-ethylhexoxide).

9. (original) The process of claim 5 wherein the alkyl magnesium compound is diethyl

magnesium, dipropyl magnesium, dibutyl magnesium or butylethylmagnesium.

10. (original) The process of claim 5 wherein the alcohol is selected from the group consisting of ethanol, propanol, isopropanol, butanol, isobutanol, 2-methyl-pentanol, and 2-ethylhexanol.

11. (original) The process of claim 5 wherein the organometallic preactivating agent comprises an aluminum alkyl.

12. (original) The process of claim 5 wherein the first halogentating/titanating agent is a blend of two tetra-substituted titanium compounds with all four substituents being the same and the substituents being a halide or an alkoxide or phenoxide with 2 to 10 carbon atoms.

13. (original) The process of claim 12 wherein the first halogentating/titanating agent is a blend of a titanium halide and an organic titanate.

14. (original) The process of claim 13 wherein the first halogentating/titanating agent is a blend of TiCl_4 and $\text{Ti}(\text{OBu})_4$ in a range from 0.5:1 to 6:1 $\text{TiCl}_4/\text{Ti}(\text{OBu})_4$.

15. (currently amended) The process of claim 5 wherein the reaction further comprises contacting the magnesium dialkoxide and halogenating agent with an electron donor.

16. (currently amended) The process of claim 15 wherein the ratio of electron donor to magnesium dialkoxide is in the range of about 0:1 to about 10:1.

17. (original) The process of claim 15 wherein the electron donor is an ether.

18. (currently amended) The process of claim 5 wherein the halogenating agent is of the general formula ClAR^{m}_x , wherein A is a nonreducing oxyphilic ~~compound~~ atom, R^{m} is a hydrocarbyl or substituted hydrocarbyl moiety having from about 2 to 6 carbon atoms, and x is the valence of A

minus 1.

19. (original) The process of claim 18 wherein the halogenating agent is $\text{ClTi}(\text{O}^i\text{Pr})_3$.

20. (currently amended) The process of claim 5 wherein at least one of the reaction products A, B, C and D are washed with a hydrocarbon solvent by agitation of the reaction product in the solvent, allowing the reaction product to settle and decanting the solvent, until titanium species [Ti] content is less than about 100 mmol/L in the decanted solvent.

21. (currently amended) The process of claim 5 wherein an electron donor is present in any one or more of steps a), b), c), or d), and wherein the ratio of electron donor to ~~metal~~ magnesium alkyl is in the range of about 0:1 to about 10:1.

22. (original) The process of claim 5 further comprising placing the catalyst of the invention on an inert support.

23. (original) The process of claim 22 wherein the inert support is a magnesium compound.

24. (currently amended) A catalyst produced by a process comprising:

a) contacting a catalyst component with an organometallic preactivating agent, wherein the catalyst component is produced by a process comprising,

i) contacting a magnesium dialkoxide compound of the general formula $\text{Mg}(\text{OR}''')_2$ with a halogenating agent capable of exchanging one halogen for one alkoxide to form a reaction product A, where R''' is a hydrocarbyl or substituted hydrocarbyl having from 1 to 20 carbon atoms;

ii) contacting reaction product A with a first halogenating/titanating agent to form reaction product B;

iii) contacting reaction product B with a second halogenating/titanating agent to form reaction product C; and

iv) contacting reaction product C with a third halogenating/titanating agent to form a catalyst component;

wherein the magnesium dialkoxide compound is a the reaction product of a reaction comprising a magnesium alkyl compound of the general formula $MgRR'$, wherein R and R' are alkyl groups of 1-10 carbon atoms and ~~may be~~ are the same or different, an alcohol of the general formula $R''OH$ wherein the alcohol is linear or branched and wherein R'' is an alkyl group of 2-20 carbon atoms, and an aluminum alkyl of the formula AlR'''_3 wherein at least one R''' is an alkyl or alkoxide having 1-8 carbon atoms ~~or a halide~~, and wherein each R''' ~~may be~~ is the same or different; and wherein the average particle size of the catalyst increases with an increased aluminum alkyl to magnesium alkyl ratio.

25. (currently amended) The catalyst of claim 24 wherein the organometallic preactivating agent is an aluminum alkyl of the formula AlR_3 wherein at least one R is an alkyl having 1-8 carbon atoms ~~or a halide~~, and wherein each R ~~may be~~ is the same or different.

26. (original) The catalyst of claim 25 wherein the organometallic preactivating agent is a trialkyl aluminum.

27. (original) The catalyst of claim 24 wherein the second and third halogenating/titanating agents comprise titanium tetrachloride.

28. (currently Amended) The catalyst of claim 24 wherein the ratio of aluminum to titanium ~~is in~~ the final product is in the range from 0.1:1 to 2:1.

Claims 29-36 Cancelled.